Non-contact thermometry best done with *INFRATHERM* pyrometers

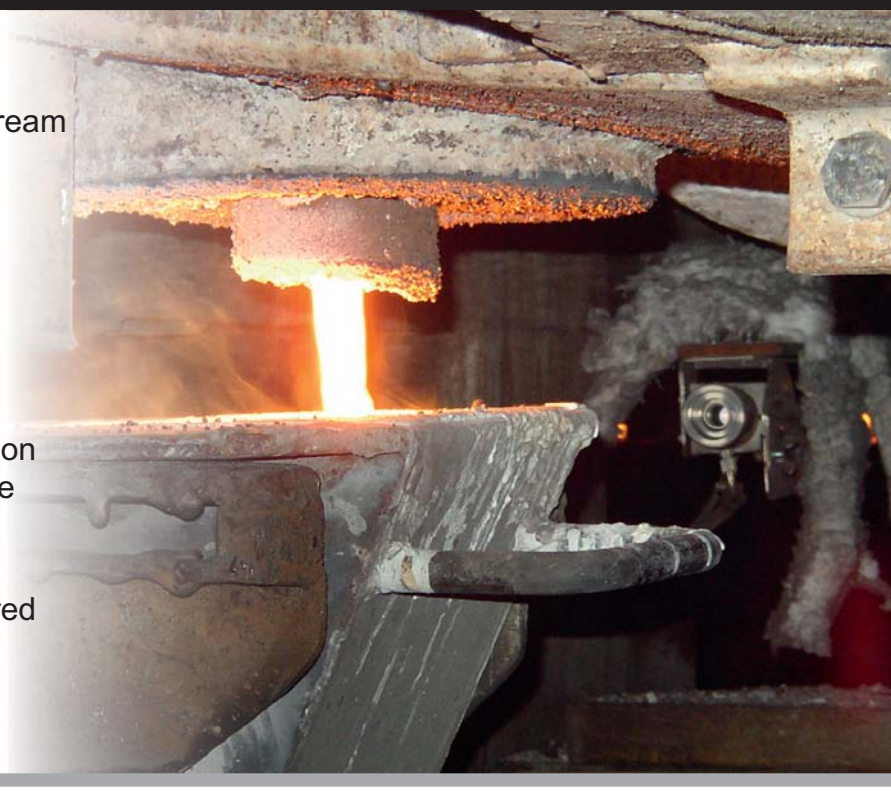
impac®
Mikron Group

certified ISO 9001:2000 IMPAC Infrared

ISR 12-LO/GS

Foundry measuring system for cast iron

Digital 2-color pyrometer with fibre optic for non-contact temperature measurement of a cast iron puring stream



- Accurate measurement of pouring stream
- Automatic recording of the pouring temperature
- Documentation of the temperature of each single pouring process
- Replacement or reduction of immersion lance measurements with expandable thermocouples
- Minimum system maintenance required

The pyrometers **ISR 12-LO/GS** is a special foundry system for the measurement of the pouring stream in foundries. This system is useful in automatic or semi automatic pouring machines and displays the temperature after each single pouring process.
A ratio pyrometer is required for this application because

- molten metal has a very low and fluctuating emissivity
- the position of the pouring stream is moving so that the measuring spot of the pyrometer is only partially filled

The pyrometer has a special pouring stream mode which calculates one average temperature value for each single casting process. Temperature values in the beginning and the end of the casting process can be eliminated which can affect the correct measurement. The shape of the spot size of the optics is a line which guarantees that even a moving pouring stream is always within the spot.

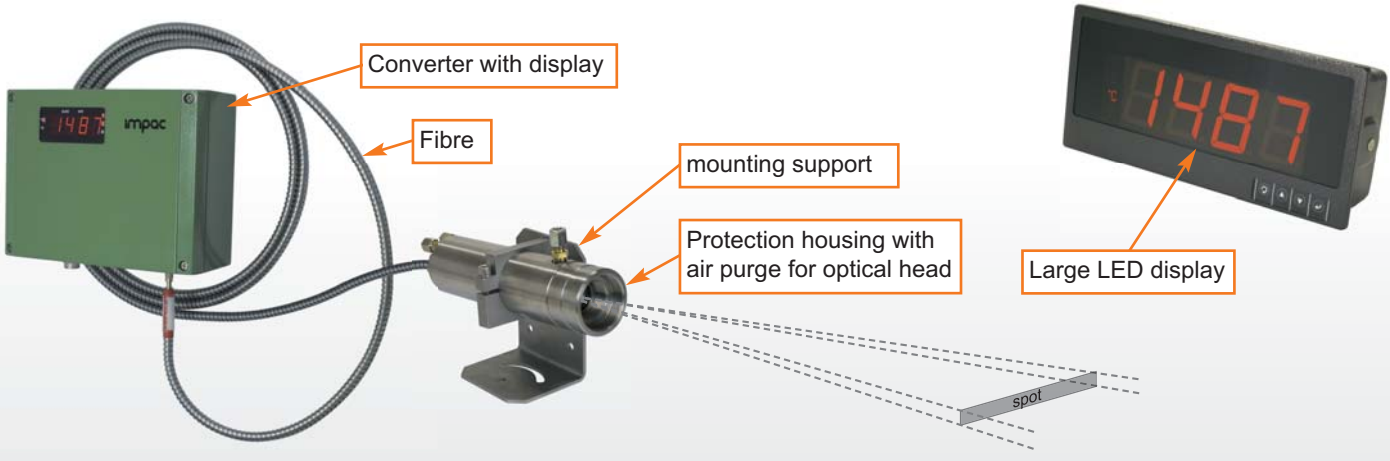
The pyrometers are equipped with a lens contamination monitoring system. If the signal strength is too low caused by ontamination of the lens or a sighting window, a signal output switches an alarm transmitter.

The pouring stream temperature of each single casting process and with that of each single casted part can be recorded automatically with the ISR 12-LO/GS. The temperature value of each finished casting process is displayed on the pyrometer and available as analog and digital output. With that the casting can be controlled very accurately to achieve the high quality requirements of casted parts.
The measured values can be stored and displayed via analog and digital output.

Technical data

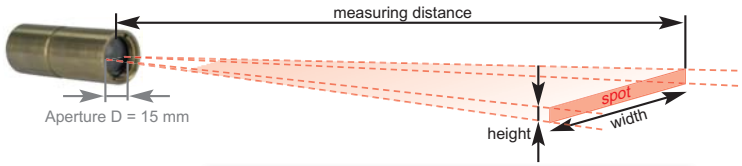
Temperature ranges:	750 ... 1800°C (MB 18) 900 ... 2500°C (MB 25)
Sub range:	any range adjustable within the temperature range, minimum span 51°C
Spectral range:	0.8 µm / 1.05 µm
Measuring modes:	Pouring stream / ratio- (2-color-) / mono- / metal mode switchable
Power supply:	24 V DC (15 ... 40 V DC) or 24 V AC (12 ... 30 V AC), 48 ... 62Hz
Power consumption:	max. 10 W
Analog output:	0 ... 20 mA or 4 ... 20 mA switchable, load 0 ... 500 Ohm, test current 10 mA by pressing test key
Digital interface:	Switchable: RS232 or RS485 addressable (half duplex), baud rate 2.4 up to 115.2 kBd
Resolution:	display: 1°C; interface: 0.1°C; analog output: < 0.025% of temperature range
Isolation:	power supply, analog output and digital interface are galvanically isolated from each other
Display:	Built-in 4-digit 7-segment-LED, height 13 mm; LED's for: - °C/°F; - clear mode "auto","ext"; - ratio- (2-color) / mono- / metal mode
Parameters:	Adjustable or readable at the device or via interface: emissivity slope K, emissivity ε, exposure time t_{90}, clear times for maximum value storage t_{CL}, automatically or external deletion of maximum value storage, switching measuring mode, switch-off limit, 0 ... 20 or 4 ... 20 mA, sub range, address, baud rate, °C/°F Readable at the device or via interface: pouring stream temperature (in 1-color mode: measuring temperature) Nur über Schnittstellenbefehle einstellbar: Pre-run time, follow-up time, start condition, wait time t_W, keyboard lock
Pre-run time:	0 ... 9,9 s adjustable in steps of 0.1 s
Follow-up time:	0 ... 9.9 s adjustable in steps of 0.1 s
Start condition:	0 ... 99% (amount of measurement values in % that must exceed the beginning of the adjusted temperature range)
Emissivity slope K:	ε1 / ε2: 0,8 ... 1,2 (adjustable in steps of 0.001)
Emissivity ε:	0.1 ... 1 (adjustable in steps of 0.001)
Switch-off limit:	2% ... 50% (in 1%-steps)
Exposure time t_{90}:	2 ms (with dynamical adaptation at low signal levels), adjustable to 0.01 s; 0.05 s; 0.25 s; 1 s; 3 s; 10 s
Maximum value storage:	Built-in single or double storage. Clearing with adjusted time t_{clear} (OFF; 0.01 s; 0.05 s; 0.25 s; 1 s; 5 s; 25 s), extern, via interface or automatically with the next measuring object, hold function to freeze the actual displayed pouring stream temperature
Switch contact:	max. 0.15 A (only active with automatic clear mode or $t_{CL} \geq 0.5$ s)
Measuring uncertainty: (ε = 1, t_{90} = 1 s)	0.4% of reading in °C + 1°C (< 1500 °C) 0.6% of reading in °C + 1°C (> 1500 °C)
Repeatability:	0.2% of reading in °C + 1°C
Control panel:	4 function keys, switch for serial interface, push button for test current
Protection class:	IP 65 (DIN 40 050)
Ambient temperature:	Converter housing: 0 ... 60°C Optical head: up to 250°C
Storage temperature:	-20 ... 70°C
Weight converter:	2.2 kg
Sighting:	Laser targeting light, Laser class 2, max. laser power level < 1 mW, λ = 655 nm (measurement is stopped while laser targeting light is switched on)
CE-label:	According to EU directives about electromagnetic immunity

Connection scheme



Optical heads

2 different optical heads are available. They have a special spot size in shape of a line which guarantees that even a moving pouring stream can always be captured. The optical heads differ in its spot size depending on the measuring distance. The correct selection depends on the size of the pouring stream, if the pouring stream is moving and the required distance to the stream.
The optical head has to be adjusted to required measuring distance to reach the specified spot sizes. Distances between 340 and 4500 mm are possible.
The table shows some examples for different measuring distances (distance measured from front of the lens to the object).

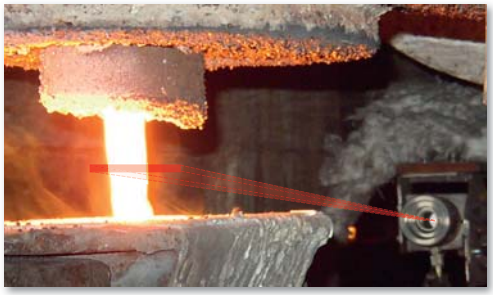


Optical head with line spot width = 5% of measuring distance

meas. distance a [mm]	spot M [mm] width x height
340	17 x 1.6
500	25 x 2.4
750	37.5 x 3.8
1000	50 x 5
2000	100 x 11

Optical head with line spot width = 12% of measuring distance

meas. distance a [mm]	spot M [mm] width x height
340	41 x 1.6
500	60 x 2.4
750	90 x 3.8
1000	120 x 5
2000	240 x 11



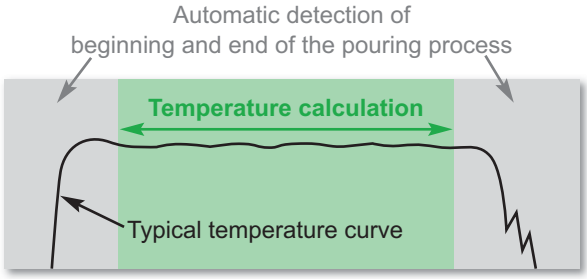
Fibre

The radiation, coming in through the optical head, is transported via the lens system into the glass fibre with flexible stainless steel protection tube where it is transmitted along to the converter. As the optical head contains only the lens system and the sensor and the electronics are located in the converter box, fibre and optical head can withstand ambient temperatures up to 250°C without cooling. The fibre has a red color mark that has to be mounted on the converter's side.

Fibre length:	2.5 m in scope of delivery, 5 m, 7.5 m, 10 m, 15 m, 30 m on request
Ambient temperature:	max. 250°C (converter's side with red color mark max 125°C)
Minimum bending radius:	50 mm for short time, 120 mm permanently

Surveillance of pouring stream and data analysis

Automatic detection of pouring stream:
The ISR 12-LO/GS detects automatically the beginning and end of a pouring process and with this it is able to determine autonomously the required measuring time interval. The start and end processes of the pouring disturb the temperature calculation and have to be separated.
The result is a single temperature which is determined by the corresponding pouring time. After each pouring process this temperature will be displayed at the pyrometer itself and can be indicated additionally on further displays.



Data analysis with software *InfraWin*:
Each temperature value of all single pourings an be indicated, analyzed and stored easily with the PC-software *InfraWin* (part of the delivery).

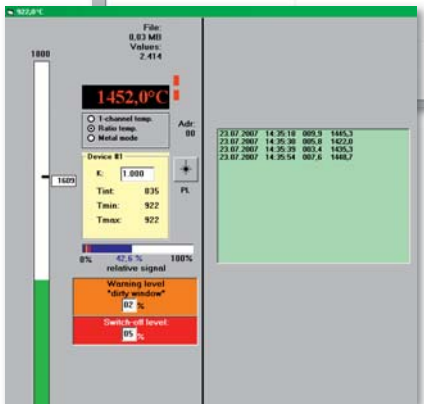
Using the window "online trend" the monitor shows each new temperature value with the corresponding measuring time as a graph sequently. The acceptable limits of the pouring stream temperatures can be colour-marked for easy recognition of deviations.

Using the window "color bar" the monitor shows each new temperature value as digital indication and bar graph and is listing each temperature value with date, time and pouring duration after each finished pouring.

Additional displays such as e.g. signal strength inform about the reliability of the measuring results.

A list with all single pouring stream temperatures can be stored in a file for complete documentation and proof of the compliance with the required temperature of each pouring. This file can be opened with a text editor or import into other software, e.g. Excel.

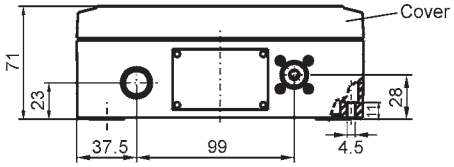
online trend window



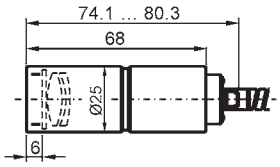
color bar window

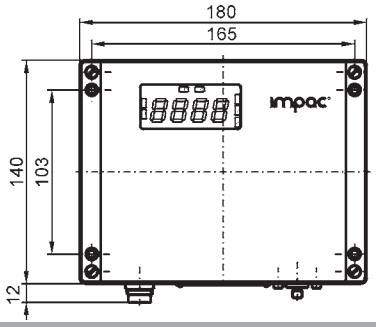
Dimensions

Converter:

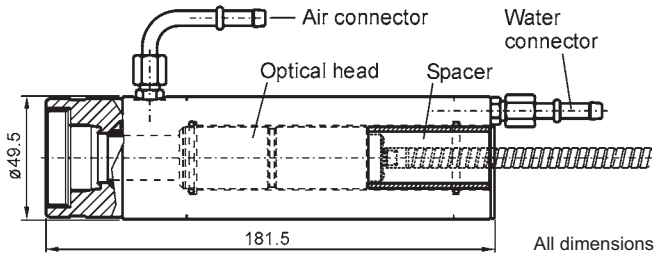


Optical head:





Water cooling jacket (option):



All dimensions in mm

Reference numbers

Pyrometer:

3 855 170	ISR 12-LO/GS	MB 18: 750 ... 1800°C
3 855 190	ISR 12-LO/GS	MB 25: 900 ... 2500°C

Scope of delivery:
Converter, optical fibre 5% or 12%, length 2.5 m, optical head, PC analyzing software *InfraWin*, work certificate, user manual

IMPAC 24 months warranty

Note: A connection cable is not included with the instrument and has to be ordered separately

Accessories:

3 820 330	connection cable, length 5 m, straight connector
3 820 500	connection cable, length 10 m, straight connector
3 820 510	connection cable, length 15 m, straight connector
3 820 810	connection cable, length 20 m, straight connector
3 820 820	connection cable, length 25 m, straight connector
3 820 520	connection cable, length 30 m, straight connector
3 820 740	connection cable, length 5 m, straight connector, temperature resistant up to 200°C
3 837 160	Water cooling jacket with air purge unit
3 834 210	Adjustable mounting support for water cooling jacket
3 834 230	Adjustable mounting support for optical head
3 835 180	Air purge unit for optical head
3 852 190	Power supply NG AC; 230 V AC ⇒ 24 V AC, 750 mA
3 852 550	Power supply NG 2D; 85 ... 265 V AC ⇒ 24 V DC, 600 mA, with 2 limit switches
3 890 640	LED digital display DA 4000-N
3 890 650	LED digital display DA 4000: with two limit switches
3 890 560	LED digital display DA 6000-N: with possibility for pyrometer parameter settings for digital *INFRATHERM* pyrometers; RS232 interface
3 890 570	LED digital display DA 6000-N, with RS485 interface
3 890 630	ILD24-UTP, digital display, big, height of digits 57 mm

Overview accessories

Water cooling jacket with air purge unit

Adjustable mounting support for water cooling jacket

Air purge for optical head

Adjustable mounting support for optical head or air purge

LED digital display

power supply NG AC; NG 2D

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Temperature Measurement

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Specifications are subject to change without notice